US Army Corps of Engineers®
Engineer Research and Development Center

Coastal Inundation Studies for Pacific Islands

Description

View of Umatac Bay, U.S. Territory of Guam

The U.S. Army Corps of Engineers, Honolulu Engineer District, area of responsibility includes many islands in the tropical Pacific Ocean. Typically, islands are volcanic, with narrow coasts and rugged interiors. Coastal roads and communities are a vital part of island society. Many island coasts face exposure to vast expanses of open ocean. Fortunately, wave climates are generally mild, but powerful tropical storms can occasionally strike. Often a protective coral reef helps shield island shores from the huge waves that can be generated in an intense storm. Nonetheless, island roads and communities can suffer great damage due to storm-raised water levels and high waves which break and run up on shore.

Issue

Over the past decade, physics-based numerical modeling procedures for determining coastal inundation levels with return periods of up to 100 years have been developed and improved at the U.S. Army Engineer Research and Development Center by the Coastal and Hydraulics Laboratory. Study results provide the basis for flood insurance maps, governmental planning, and project design. Study areas addressed during recent years include the Territory of Guam; Island of Rota, Commonwealth of the Northern Mariana Islands; and Territory of American Samoa.

Supporting Technology

The technology used in these studies includes a suite of numerical models for tropical storm wind fields, water levels due to astronomical tide and storm surge, wind wave generation, wave transformation over complex nearshore bathymetry, nearshore wave setup, and wave runup at shore.

Benefits

Model results will provide improved estimates of wave and storm surge driven coastal inundation levels with return periods of up to 100 years.

Sponsors

U.S. Army Engineer District, Honolulu (HED)

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